

BEFORE THE ARIZONA CORPORATION COMMISSION

MARC SPITZER
Chairman

WILLIAM A. MUNDELL
Commissioner

JEFF HATCH-MILLER
Commissioner

MIKE GLEASON
Commissioner

KRISTIN K. MAYES
Commissioner

IN THE MATTER OF THE APPLICATION OF) DOCKET NO. E-01345A-03-0437
ARIZONA PUBLIC SERVICE COMPANY FOR)
A HEARING TO DETERMINE THE FAIR VALUE)
OF THE UTILITY PROPERTY OF THE COMPANY)
FOR RATEMAKING PURPOSES, TO FIX A JUST)
AND REASONABLE RATE OF RETURN THEREON)
TO APPROVE RATE SCHEDULES DESIGNED TO)
DEVELOP SUCH RETURN, AND FOR APPROVAL)
OF PURCHASED POWER CONTRACT)

DIRECT

TESTIMONY

OF

HAROLD T. JUDD

ON BEHALF OF

UTILITIES DIVISION

ARIZONA CORPORATION COMMISSION

February 3, 2004

TABLE OF CONTENTS

	<u>Page</u>
Introduction	4
Summary of recommendations	8
Issue #1: Reducing decommissioning expense by excluding assets with future useful life	11
Issue #2: Decommissioning funding escalation factor	15
Issue #3: Assumed rate of return for decommissioning fund	18
Issue #4: Reducing decommissioning expense for Palo Verde Unit 2 by aligning decommissioning charges with operating life	19
Conclusion	26

EXECUTIVE SUMMARY
ARIZONA PUBLIC SERVICE COMPANY
DOCKET NO. E-01345A-02-0403

Mr. Judd testifies on ways to modify decommissioning funding by APS customers. His recommendations are designed to align decommissioning expense collection with the remaining operation life of the Palo Verde units. Mr. Judd also recommends correcting the decommissioning cost estimate by recognizing that some assets included in the cost estimate will have a useful life after the nuclear units are out of service. If his recommendations are adopted, the annual decommissioning obligation of APS customers will be reduced by \$5.6 million to \$13,611,000.

1 Q. Please state your name, business address, and position.
2

3 A. My name is Harold T. Judd. I am Vice President of Accion Group, Inc.,
4 consultants to the energy industry. Our main office is at 244 North Main Street,
5 Concord, New Hampshire 03301-5041.
6

7 **Q. Please describe the clients of Accion Group.**
8

9 A. Accion Group provides strategic planning, operational evaluation and regulatory
10 support services to utilities and to state regulatory agencies nationwide.
11

12 **Q. What is the purpose of your testimony?**
13

14 A. Accion Group was retained by the ACC Staff to review the nuclear
15 decommissioning expense charges proposed to be included in the cost of service
16 determination for APS. My testimony addresses that review and our
17 recommendations concerning the amount of decommissioning costs of the Palo
18 Verde units that should be included in APS's jurisdictional retail rates.
19

20 **Q. Please describe your prior work experience.**
21

22 A. I began my career in 1978 in New Hampshire as the Deputy Consumer
23 Advocate for the Legislative Utilities Consumer Counsel. I left that office as

1 Acting Consumer Advocate in 1979 to become the Deputy General
2 Counsel and Energy Advisor to the Special Assistant to the President in
3 the White House Office of Consumer Affairs. In 1981, I was appointed an
4 Assistant Solicitor for the Department of Energy. From 1985 through 1987, I
5 served as the Economic Development Advisor to the Congress of the Federated
6 States of Micronesia, and as Special Counsel to the President of the FSM. From
7 September 1989 until January 1994, I served in the Office of the Attorney General
8 for the State of New Hampshire, first as an Assistant Attorney General and later
9 as a Senior Assistant Attorney General. In 1994, I entered the private practice of
10 law in Concord, New Hampshire where I provided general utility and corporate
11 representation with an emphasis on utility restructuring. In 1996, I became the
12 National Regulatory Manager for Southern Electric International, a wholly owned
13 subsidiary of the Southern Company. In 1997, I joined PG&E Energy Services, a
14 wholly owned subsidiary of PG&E Corporation, as Chief Counsel and Director of
15 Regulatory Policy. I am a founding director of Accion Group, Inc., which was
16 formed in 2001.

17
18 **Q. Please describe your education.**

19
20 **A.** I graduated from the University of Wisconsin at Madison in 1974 with a
21 B.A. Degree. In 1978, I received a law degree from the Franklin Pierce
22 Law Center. I have continued my education through professional
23 education courses.

1 **Q. What is your experience in the field of nuclear decommissioning?**

2
3 A. In 1979 I drafted what was to become the first nuclear decommissioning statute
4 for the State of New Hampshire. In light of the controversy surrounding the
5 Seabrook Station, the state opted to establish rigorous decommissioning standards
6 that exceeded those imposed by the Nuclear Regulatory Commission (NRC) and
7 established a committee of state officials, known as the Nuclear
8 Decommissioning Fund Committee (NDFC), to oversee decommissioning
9 funding. Since 1999 I have represented the NDFC as legal counsel, while my
10 firm has also provided financial and engineering expertise to the committee. In
11 2000, on behalf of the NDFC and the New Hampshire Legislature, I authored a
12 complete revision to the state's decommissioning statute in anticipation of the
13 Seabrook Station sale to a merchant generator. New Hampshire now has the most
14 comprehensive decommissioning statute in the nation, addressing all of the major
15 decommissioning issues facing the industry.

16
17 **Q. Briefly describe your review of the decommissioning costs for the Palo Verde**
18 **units.**

19
20 A. In addition to reviewing APS's pre-flied testimony and exhibits, we reviewed the
21 study used by Palo Verde as a basis for projecting the cost of decommissioning
22 all three Palo Verde units. As part of that review we considered the assumptions
23 developed by APS for the storage and disposal of radioactive waste and spent

1 nuclear fuel, the activities included in the decommissioning estimate, and the
2 period over which decommissioning, including the ultimate disposal of spent
3 nuclear fuel, is projected to be completed. We reviewed the assumptions that
4 APS used in developing the schedule of payments necessary to meet the
5 decommissioning funding requirements that the study concluded were necessary.
6 These included escalation, inflation, funding period and the impact of the
7 uncertainties inherent in estimating the cost of disposing of decommissioning-
8 generated low level radioactive waste. We also evaluated APS's proposal to
9 recover its projected annual decommissioning contributions in retail rates from
10 Arizona ratepayers.

11
12 **Q. Briefly describe how APS accounts for decommissioning costs for the Palo**
13 **Verde units in the rate application.**

14
15 **A.** Simply stated, APS segregated decommissioning expenses into three discrete
16 amounts. There is an amount for the funding of decommissioning each of the
17 Palo Verde Units 1 through 3 and all facilities other than the Independent Spent
18 Fuel Storage Installation (ISFSI). The ISFSI expense is accounted for in two
19 pieces, with the post shutdown expense separated from the ISFSI amortization
20 requirement. Each account is identified in Attachment DGR-6 that accompanies
21 the pre-filed testimony of APS witness Donald G. Robinson.
22

1 **Q. In summary, what did you determine?**

2
3 A. Our review showed that the cost estimate prepared for the Palo Verde units, for
4 the most part, conforms to the methodology employed in the industry and applies
5 the same standards as applied by the vast majority of other nuclear stations in the
6 U.S and are consistent with the minimum requirements of the NRC. The
7 decommissioning study that was completed in 2001 was relied upon to project
8 decommissioning costs and to establish the funding schedule presented by APS.
9 The decommissioning study was conducted by TLG Services, using conservative
10 estimates of disposal costs. The assumptions that APS used in their schedule of
11 payments model such as escalation, inflation and the cost of Low Level
12 Radiological Waste (LLRW) disposal were also reasonable and in line with
13 current industry thinking.
14

15 **Q. Are there adjustments to APS' cost of service request that you recommend**
16 **be made in this rate case?**

17
18 A. Yes, I have two. First, I recommend that the projected cost of decommissioning
19 be reduced to reflect the probability that certain of the structures, systems and
20 infrastructure of the site will have residual commercial and industrial value after,
21 or even during, decommissioning. If done, the estimated cost of
22 decommissioning Palo Verde would be reduced by approximately \$89 million and
23 the annual contribution by APS customers would be reduced by \$800,000.

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22

Second, I recommend that the Unit 2 decommissioning funding schedule be adjusted to match the licensed life of the unit. As discussed below, this would significantly reduce the required annual contribution to the Trust yet meet the desire to be fully funded when the plant is out of the rate base. This change would reduce the annual contribution by approximately \$4.8 million. Together, these two adjustments would reduce the annual contribution by APS customers to \$13,611,000.

Q. Please summarize the options available to the ACC for setting the criteria for the proper scope of decommissioning.

A. There are four that have been generally used. First, federal law (10 CFR 50.75) requires that all nuclear power plants meet the NRC Minimum funding requirements. This is a non-site specific formulaic approach. The starting point is a 1986 decommissioning estimate for the Trojan Nuclear Plant in Oregon that is then escalated to the present through labor, energy, and low level radioactive waste disposal cost adjustments prescribed in the regulations. Many states, however, require a site-specific estimate that significantly exceeds the NRC Minimum.

1 Second, there is the Licensing Termination Estimate that is a site-specific estimate
2 that projects the cost of meeting the NRC's requirements (10 CFR 20) for
3 removing radiological contamination and releasing the site for unrestricted use.
4 This is generally 75% to 95% of a Full Site Restoration or "greenfields" estimate.
5 A Full Site Restoration estimate assumes that essentially all site structures and
6 systems are removed and the surface is restored to a condition close to its natural
7 state. This is essentially the type of estimate presented in the 2001 TLG Study for
8 Palo Verde.

9
10 Finally, there is the Commercial-Industrial Estimate. This is an approach to
11 decommissioning in which certain of the buildings, structures, systems and
12 physical features constructed for the operating station are deemed to have value
13 for the site's post-nuclear commercial or industrial development and are,
14 therefore, excluded from the scope of the estimate.

15
16 **Q. Does a Commercial-Industrial Estimate exclude all non-radiologically**
17 **contaminated structures from the scope of decommissioning?**

18
19 **A.** No. Only those that are likely, or at least have reasonable potential, to be used for
20 another commercial or industrial purpose once the nuclear reactor is removed are
21 excluded from the decommissioning cost estimate. For example, power block
22 buildings that will be heavily damaged through the decontamination process
23 would be assumed to be completely dismantled and the costs included in the

1 estimate. A cooling tower, however, that could be used to support a re-powering
2 of the site would have continuing value and would not be included in the
3 decommissioning estimate.
4

5 **Q. What is the scope of the Palo Verde decommissioning study?**
6

7 A. The Palo Verde decommissioning cost study assumes that all site structures and
8 systems except the switchyard and site drainage facilities will be removed by the
9 end of the operation life of the nuclear reactors.
10

11 **Q. What are your views on APS' approach to developing it's cost estimates?**
12

13 A. The Palo Verde decommissioning cost study is consistent with traditional
14 decommissioning studies in not recognizing that some on-site improvements will
15 have continuing usefulness after the nuclear facilities are out of service. It is my
16 opinion, however, that assets with remaining commercial value should be
17 excluded from the cost estimate of decommissioning to avoid overstating the
18 decommissioning cost and, in turn, overcharging customers.
19

20 **Q. What types of improvements are included in the Palo Verde**
21 **decommissioning study that could be excluded from the decommissioning**
22 **cost estimate?**
23

1 A. If there is a possibility that another power plant requiring cooling water will be
2 located at the site, the Circulating Water Systems, the Water Reclamation
3 facilities and pipelines, spray ponds, evaporation ponds, Cooling Towers and the
4 Make-up Reservoir should be excluded from nuclear decommissioning. The
5 Diesel Generators and their supporting systems could have value as power
6 sources once freed from their emergency requirements. Non-contaminated
7 support buildings could be used for power or non-power applications as
8 warehouses, shops or office space. Roads, parking lots, potable water systems,
9 sewage systems and other infrastructure would also have value for a wide range
10 of potential future commercial or industrial ventures.

11
12 **Q. Have you determined how much the Palo Verde decommissioning cost**
13 **estimate could be reduced if it took the Commercial-Industrial approach?**

14
15 A. Based on a review limited to the spreadsheets (Appendices C, H, I, J, K, and L)
16 contained in the 2001 Palo Verde Decommissioning Cost Study, it appears that a
17 Commercial-Industrial approach that excludes the dismantling activities discussed
18 above would reduce the estimated cost by about \$89 million. Attachment HTJ-1.
19 This is a conservative estimate as it does not include the commensurate reduction
20 in period dependent costs such as Utility Staff, energy, heavy equipment rental,
21 and insurance that would result from the exclusion of these activities from the
22 estimate. In Attachment HTJ-2 I have provided a summary of the NRC
23 Minimum, Full Site Restoration, License Termination and Commercial/Industrial

1 Estimates to demonstrate the impact of recognizing the value of limiting
2 decommissioning activities by not including the cost of removing improvements
3 that have residual usefulness. The reduction in the overall estimate is small, about
4 5%, but no insignificant.

5

6 **Q. What would be the effect of removing those assets from the decommissioning**
7 **cost estimate?**

8

9 A. The immediate and obvious effects would be to decrease the cost estimate and to
10 reduce the annual contribution to the decommissioning fund. Other effects would
11 be to encourage realistic planning for future use of the site, including its role in
12 meeting future energy needs.

13

14 This estimate of effect is based on our review of the facilities included in the Palo
15 Verde decommissioning plan. However, the precise effect of removing facilities
16 from the decommissioning plan will only be known after there is a new
17 comprehensive decommissioning study performed for the Palo Verde units,
18 excluding all assets that have a useful life after the nuclear units are shut down.
19 Each decommissioning study is a detailed work plan for dismantling a nuclear
20 station, including the order in which things are removed. Typically, the
21 decommissioning and demolition process takes ten years before a nuclear site is
22 reduced to the ISFSI. In order to correctly account for the change in cost, it will
23 be necessary to adjust the decommissioning plan, and the corresponding earnings

1 and withdrawals from the decommissioning trust fund, to reflect the timing of
2 when the facilities remaining in the decommissioning plan will be removed.
3

4 **Q. Is this recognition of remaining commercial life used elsewhere?**
5

6 A. Yes. New Hampshire moved to this standard in 2000 in recognition of the fact
7 that the Seabrook site would be used for other commercial purposes during and
8 after decommissioning. This step was taken in response to the desires of local
9 communities that were anxious to improve the likelihood that commercial and
10 industrial facilities would continue to be located at the site to support their tax
11 base and provide jobs. The joint owners of the Seabrook Station also recognized
12 the value of this approach because it reduced decommissioning funding
13 obligations and signaled a governmental recognition of the likelihood that
14 generation facilities might be located at the site in the future.
15

16 **Q. If the projected cost of decommissioning is reduced by \$89 million, what**
17 **impact would that have on the annual contribution to the decommissioning**
18 **trust?**
19

20 A. I estimate that the annual decommissioning cost would be reduced by
21 approximately \$800,000. As discussed above, it will be necessary to determine
22 the timing of each decommissioning activity to have a more precise appreciation
23 for the effect on the annual contribution. I believe it is appropriate in this rate

1 case to use my estimate for the purpose of establishing APS' retail rates. A more
2 comprehensive analysis of the impact of using the Commercial/Industrial
3 approach can then be provided by APS during a future rate case.
4

5 **Q. Have you reviewed the Schedule of Amounts to be Deposited in the Palo**
6 **Verde Decommissioning Trusts included in APS' Cost of Service,**
7 **Attachment DGR-6 and the assumptions that were used to develop that**
8 **schedule?**
9

10 **A.** Yes I have. Attachment HTJ-3 is a summary of the assumptions and conclusions
11 contained in the 2001 Pal Verde Decommissioning Cost Study. I previously
12 discussed the appropriateness of the APS cost estimate. Next I will discuss the
13 escalation rate employed to estimate the ultimate cost in nominal dollars of the
14 decommissioning effort that will be required at the end of the projected license
15 life of the three units, the expected rate of return on the funds contributed into the
16 trusts, and the periods over which APS will be contributing to the
17 decommissioning Trust.
18

19 **Q. Would you please explain the "escalation" factor?**
20

21 **A.** The cost estimate utilized to develop the funding schedule is an estimate of what
22 it would cost to decommission the Palo Verde plant today if it were in the
23 condition it is expected to be in at the time the plant's license terminates. The

1 estimate is based on today's labor, material, and waste disposal costs. In order to
2 assure that enough funding is available to complete the necessary
3 decommissioning tasks, the cost estimate has to be inflated to reflect anticipated
4 increases in the costs of labor materials and waste disposal as well as increases in
5 taxes and regulatory expenses. This rate of inflation applied to decommissioning
6 activities is referred to as "escalation". As discussed in the testimony of APS
7 witness Robinson, APS uses a 4% rate, which reflects the long-term historic
8 general inflation of the overall economy in the past twenty years.

9
10 **Q. Do you believe that a 4% escalation rate is appropriate?**

11
12 **A.** Yes. This opinion is based on a recent review of the escalation rates of costs
13 associated with decommissioning a nuclear power station that was completed by
14 the New Hampshire Nuclear Decommissioning Financing Committee (NDFC) in
15 December 2003. Seabrook Station proposed a decommissioning escalation rate
16 calculated in accordance with the NRC standards set forth in 10 CFR 50.75.
17 Their overall rate had four components: labor, material, energy and transportation,
18 and low level radioactive waste (LLRW) disposal. Regional government-
19 sanctioned indices were used to determine the projected rates of inflation over the
20 funding period for labor, material and energy and transportation. The LLRW
21 disposal component, usually the most volatile, was determined using the
22 methodology of the NRC's set forth in NUREG 1307. An average of these four
23 components, weighted in accordance with their percentage of the overall

1 estimated decommissioning cost, was then calculated to be 4.1%. The NDFC
2 accepted the owners' escalation methodology, but added a contingency factor of
3 0.4% to reflect perceived risks not accounted for in the Seabrook cost estimate.
4 While APS' escalation rate is lower, resulting in lower contribution requirements
5 and ultimately in less funds being available to pay for the clean up of the Palo
6 Verde plant, it appears to be reasonable at this time.

7
8 **Q. Is the escalation factor an assumption that should be periodically reviewed**
9 **by this Commission?**

10

11 A. Yes. The Commission should require APS to propose an escalation rate each time
12 that it submits a comprehensive decommissioning study. APS should include a
13 detailed description of the methodology, the assumptions and the calculation for
14 ACC review and approval. In light of the fact that the Palo Verde plant is
15 expected to operate for an additional twenty years, any deviations in funding
16 resulting from under or over estimation of the escalation rate can then be
17 remedied through gradual adjustment of the annual contribution rate.

18

19 **Q. Have you reviewed the anticipated rates of return on funds invested in the**
20 **Trusts?**

21

22 A. Yes. APS primarily contributes its decommissioning funding into tax advantaged
23 Qualified Trusts. These Trusts pay taxes on earnings at a Federal rate of 20% as

1 compared to the higher corporate rates that would otherwise apply. Investments
2 are made pursuant to established guidelines that permit investments in qualifying
3 equities and fixed income securities as well as in other securities permitted by the
4 guidelines. APS bases its earnings estimates on advice provided to it by the funds
5 investment advisors. In the current case, APS has assumed that the Trusts will
6 earn at a blended after-tax rate of 4.8%, compounded annually for the life of the
7 trusts. This estimate appears to be within the range of earnings estimates for
8 similar investments of which I am aware.

9

10 **Q. Is this estimate reasonable?**

11

12 A. Yes I believe it is.

13

14 **Q. Should the Commission review this assumption periodically?**

15

16 A. Yes it should. Annual rates of return on investments can be highly volatile and
17 shortfalls or greater than expected annual performance can have significant
18 impacts on required contribution levels. I would therefore recommend that APS
19 be required to provide to the ACC detailed annual performance data on each of its
20 Trusts, clearly describing actual earned rates of return and proposed changes in
21 funding levels that may be required to mitigate the effect of any variance in
22 earnings experienced. Annually, APS should also provide to the ACC its
23 estimated rate of return on its investments in the Trusts for the remainder of the

1 Trusts life. As with the escalation factor, APS should be required to fully discuss
2 the estimated rates of return on funds invested in the Decommissioning Trusts
3 each time a new cost estimate is prepared and a comprehensive review of the
4 adequacy of the Trusts is conducted.

5

6 **Q Has APS made an assumption regarding when it will complete funding of the**
7 **Decommissioning Trusts?**

8

9 A Yes. APS has assumed that the funding period for Units 1 and 3 will be through
10 2026 and the funding period for unit 2 will be through 2015.

11

12 **Q. Please explain the significance of the decommissioning funding period.**

13

14 A Certainly. The period over which contributions are made dictates the annual
15 contribution level. Typically, owners of nuclear facilities fund the
16 Decommissioning Trusts over the plant's authorized license life. APS has chosen
17 to do that for units 1 and 3. However, APS is funding and seeking recovery of
18 annual contributions to the Unit 2 trusts that reflect its obligation to fully fund
19 those trusts by 2015.

20

21 **Q. Why is APS funding decommissioning costs for Unit 2 over a period less than**
22 **the unit's operating license life?**

23

1 A. The obligation to use a shorter period arose as a result of a financing transaction
2 APS entered into with regard to Unit 2. In Decision 58644 in ACC Docket No.
3 U1345-94-120, the Commission authorized APS to recover in rates the
4 decommissioning contributions that reflect APS' obligation to fully fund the Unit
5 2 Trusts by 2015. However, in that decision the Commission noted that

6 ...the Commission shall not be bound in any subsequent rate case
7 to adopt the decommissioning funding levels or decommissioning
8 factors adopted and approved herein.... (at p. 6).

9
10 **Q. Is APS asking to recover those accelerated contributions in rates to be**
11 **established in this case?**

12
13 A. Yes they are. In addition, APS is seeking recovery of its Unit 2 spent nuclear fuel
14 disposal costs (the expenses and amortization amount referred to by Mr. Robinson
15 as the Independent Spent Fuel Storage Installation costs).

16
17 **Q. What is the effect of having customers fund the Unit 2 trust and ISFSI costs**
18 **over a period shorter than the licensed life of the Unit.**

19
20 A. The accelerated funding has several effects on customers' rates, some beneficial
21 and some adverse to current customers. Since the funding levels that are
22 ultimately required to decommission the plant and the ISFSI are not affected by
23 the timing of fund contributions, accelerating contributions and the recovery of

1 disposal costs will actually reduce total customer payments to fully fund the
2 Trusts and dispose of the spent nuclear fuel. This is because fund earnings will be
3 enhanced as a result of the higher fund balances that will be realized in earlier
4 years. However, the acceleration of payments has the effect of shifting cost
5 responsibility for decommissioning to present day customers and relieves
6 customers who will receive benefits from the plant after 2015 of the responsibility
7 for funding any part of the decommissioning expense. This intergenerational shift
8 of responsibility is adverse to the interests of current customers. I believe that for
9 rate making purposes such shifts of cost responsibility should generally be
10 avoided.

11
12 **Q. If the funding included in rates for Unit 2 were levelized over its licensed life,**
13 **what would be the annual contribution includable in rates?**

14
15 **A.** Mr. Robinson has calculated APS' 2005 decommissioning contributions to be
16 approximately \$19.2 million and it's ISFSI related expense to be approximately
17 \$1.5 million. Calculating a new payment schedule is a complex undertaking.
18 Based on the information available to me, I would estimate that if the
19 Commission were to allow recovery of decommissioning expenses and ISFSI
20 costs on the basis of levelized recovery over the licensed life of each unit, the
21 includable expense would decrease by between \$4.8 million and \$5.0 million
22 annually. This estimate was developed using the computer model used by APS to
23 determine Mr. Robinson's estimated contributions.

1 **Q. You have made two recommendations for action by the ACC in this rate**
2 **case. Do you also have any recommendations for action by the ACC in future**
3 **cases regarding APS's decommissioning contribution levels?**

4
5 A. I recommend that the ACC require APS, as part of its next comprehensive review
6 of decommissioning costs at Palo Verde, to evaluate and report to the
7 Commission on its planning for radioactive waste disposal.

8
9 **Q. How significant a component of the decommissioning cost estimate is the**
10 **disposal of low-level radioactive waste (LLRW)?**

11
12 A. Burial and recycling of LLRW constitutes about 24% of the Palo Verde 2002
13 Decommissioning Cost Estimate. As importantly, the cost of the burial of LLRW
14 is one of the components (along with labor, energy and transportation) of the
15 decommissioning escalation rate used in the NRC's 10 CFR 50.75 methodology.
16 It can, in fact, be the most volatile and significant of these components because of
17 the political and regulatory uncertainties associated with LLRW burial.

18
19 **Q. What LLRW burial sites are available to the nuclear power industry?**

20
21 A. There are currently only three facilities licensed to accept LLRW from
22 commercial nuclear power plants: a state-owned facility at Richland, Washington;
23 a state-owned facility at Barnwell, South Carolina; and Envirocare, a private

1 facility in Utah. The facility at Richland, Washington is only available to states
2 that belong to the Northwest Compact. This does not include Arizona. Since
3 Envirocare is not licensed to accept the more highly contaminated waste
4 (designated as Class B and Class C waste), these waste forms must be sent to
5 Barnwell for burial. The State of South Carolina, however, passed legislation in
6 2000 that is gradually limiting access to Barnwell and will exclude all but Atlantic
7 Compact members (South Carolina, Connecticut and New Jersey) by 2008.

8

9 **Q. What has the industry been doing to address this problem?**

10

11 A. The high cost of LLRW disposal is incenting the industry to find ways to
12 minimize the LLRW produced through changes in operations and to use off-site
13 processing to reduce the volume produced that must be buried. Off-site
14 processing consists of volume reduction performed by private vendors using
15 decontamination, compaction, dewatering, sorting and stabilizing technologies.
16 The type of LLRW sent to Barnwell is particularly suited for this treatment.

17

18 **Q. How does this situation impact decommissioning estimates?**

19

20 A. Because of the uncertain availability of a place to bury the LLRW when the plants
21 are decommissioned and the importance of these costs to properly funding
22 decommissioning, assumptions on the future costs to bury LLRW should be

1 conservative. At the same time, it is appropriate for decommissioning cost studies
2 possibly unavailable burial site.

3

4 **Q. Do you believe that the Palo Verde decommissioning cost study appropriately**
5 **addresses the impact of LLRW disposal?**

6

7 A. I believe they are conservative, but reasonable. For example, the
8 decommissioning-generated LLRW volumes at the three Palo Verde units that
9 must be sent to a burial site exceed the volumes for Seabrook Station by 4, 18 and
10 18% on a per unit basis. The assumed overall burial costs per cubic foot at Palo
11 Verde are also about 40% higher than at Seabrook Station. This probably stems
12 from APS taking less credit for offsite processing of LLRW.

13

14 **Q. What recommendations do you make for future action with respect to**
15 **LLRW disposal?**

16

17 A. I believe that APS handles projected decommissioning-generated LLRW disposal
18 costs in a conservative manner. I recommend, however, that the ACC request
19 APS to provide more detail on the basis of the assumptions related to projected
20 costs at a future Southwest Compact facility, including a breakdown of the type
21 and quantity that would be sent to Envirocare and this facility. Because of the
22 tremendous impact that escalation can have on funding, I would also recommend
23 that the ACC request that APS calculate escalation using the methodology

1 contained in 10 CFR 50.75. This includes consideration of regional labor, energy
2 and transportation costs as well as using the methodology of NUREG 1307 in
3 calculating the LLRW component of escalation. With this level of detail backing
4 up the estimate, the ACC and its staff would be in a better position to review and
5 make appropriate rulings regarding the treatment of the LLRW component of
6 decommissioning.

7

8 **Q. Do you have any recommendations for future review?**

9

10 A. Yes. I believe the ACC should review the adequacy of the funding assurances
11 provided by the out of state Palo Verde owners. Only 46.6% of Palo Verde is
12 owned by Arizona utilities. In the event of a default by out of state owners,
13 Arizona utilities could be at risk and the ability of the state to recover the
14 decommissioning obligation of a defaulting owner or others may not be assured.
15 It is appropriate for the ACC to consider whether the citizens of Arizona bear an
16 excess risk for decommissioning costs, simply because Arizona agreed to be the
17 host state for three nuclear reactors. At this time I am unaware of any reason to
18 believe any owner of Palo Verde will default on its obligation, but I also believe it
19 would be prudent for the ACC to take action before a problem exists. The NRC
20 recognizes many forms of funding assurances that could be adopted without
21 adverse impact on the owners, while at the same time providing financial
22 protection for Arizona citizens.

23

1 **Q. In conclusion, what would be the impact of your recommended adjustments**
2 **to APS' cost of service?**

3
4 A. I have recommended two adjustments. Adjusting the Unit 2 decommissioning
5 funding to match license life of the unit would reduce the annual contribution by
6 between \$4.8 million and \$5.0 million, and I recommend reducing the annual
7 contribution by \$4.8 million. Reducing the projected cost of decommissioning to
8 reflect the future commercial use of the site would reduce the projected cost by
9 approximately \$89 million, which would, in turn, reduce the annual
10 decommissioning contribution requirement by about \$800,000. Combined, these
11 recommendations would lower the annual decommissioning expense to be
12 included in the APS cost of service to \$ 13,611,000.

13
14 **Q. Does this conclude your testimony?**

15
16 A. Yes, it does.
17

**Decommissioning Costs Excluded
from the APS Estimate Using a
Commercial/Industrial Estimate
(000,000)**

ACTIVITY, COMPONENT OR SYSTEM	DECON COSTS (2001 \$)
COOLING WATER	
Circulating Water Systems	507
Plant Cooling Water	265
Essential Spray Ponds	633
Cooling Towers	3,738
Cooling Tower Electrical Building	80
Intake Structure and Canals	168
Nuclear Service Spray Ponds	5,153
Water Reclamation Facility	8,025
Water Reclamation Supply system Pipeline & Structures	34,006
Evaporation Ponds	4,921
Makeup Water Reservoir	759
Subtotal	58,255
Buildings And Support Systems	
Control Buildings	2,259
Turbine Buildings and Turbine Building Pedestal	15,318
Turbine Maintenance Facilities	66
Operations Support Building	342
Technical Support Center	277
Warehouse	1,313
Diesel Generator Building	1,071
Switchgear Building	117
Transformer Area	243
Chemical Storage Building	318
Corridor Building	232
Yard Tunnels	843
Administration Buildings (including Annex, Bldgs A and B)	1,168
Calibration Lab & Hot Instrument Calibration	15

ATTACHMENT HTJ-1
DOCKET NO. E-01345A-03-0437

Lab	
Vehicle Maintenance Facility	77
Energy Information Center	73
Fire Pumphouse	32
Guardhouse	30
LLRW Storage Facility	147
North Annex Building	176
Service Building	189
Decon & Laundry Facility	273
Miscellaneous Structures	828
Subtotal	25,407
Infrastructure	
Domestic Water	415
Fire Protection	383
Electrical (clean excluding RCA)	2,334
Sanitary Drains and Treatment	217
Retention Basin	14
Subtotal	3,363
Surface Restoration	
Grading and landscaping site	174
Site Fencing, Paving & Railroad	1,497
Subtotal	1,671
Power	
Diesel Generators and Support Systems	252
Station Blackout Gas Turbine Generator	31
Subtotal	283
GRAND TOTAL	88,979

**Summary of the Palo Verde Nuclear Generating Station
Decommissioning Estimates**
(000,000)

	PV 1	PV 2	PV 3	ISFSI	Other Facilities	Combined	Comments
NRC Minimum (2003\$)						1,095	Based on 3x the NRC Minimum as calculated for Seabrook Station in 2003
Full Site Restoration (2001\$)	511	543	578	267	73	1,972	
License Termination (2001\$)	481	514	538	261	25	1,819	
Commercial/ Industrial (2001\$)						1,883	

Palo Verde Decommissioning Assumptions
(000,000)

	PV 1	PV 2	PV 3	ISFSI	Other Facilities	Combined
Full Site Restoration Estimate (2001 \$M)	511	543	578	267	73	1972
Funding Period	2024	2025	2026	2024	2026	
Inflation of Contributions	Levelized					
Escalation of Decom Cost	4%					
LLRW Disposal (Packaging, Shipping and Burial)						
- Volume (1000cu. Ft.)	114	130	130	160		390
- Cost (2001 \$M)	147	160	164	9		480
Yucca on line	After 2010					
First Spent Fuel Shipped to Yucca	After 2010					
Last Fuel Shipped to Yucca	After 2037					
Earnings	4.8%					